



DECONTAMINATION & DECOMMISSIONING

After a half century of intensive development in the nuclear field, emphasis has shifted to D&D activities as the DOE, other government agencies and the private sector dismantle aging reactors, processing plants, laboratories and other structures. Radiological surveys are a fundamental component of restoration work taking place. Building materials and soils must be characterized for contamination, monitored as cleanup work progresses, and then certified for release. With its long history in environmental radiation and radioactivity measurements, EML is applying its expertise in a number of areas directly related to these D&D activities.



Multi-Agency Unified Approach for Radiological Surveys

The Multi-Agency Radiological Site and Survey Investigation Manual (MARSSIM) is being developed jointly by representatives from the DOE, EPA, NRC and DoD. MARSSIM will provide guidance for planning, conducting, evaluating and documenting environmental radiological surveys for demonstrating compliance with dose-based regulations for decontamination and decommissioning of nuclear facilities. MARSSIM's objective is to describe standardized and consistent approaches to conducting radiation surveys and site investigations of potentially contaminated soils and buildings, and to assist personnel in carrying out or assessing a demonstration that release criteria have been met. EML has assisted in MARSSIM development by providing input of survey design, measurement methods, and statistical analysis for the interpretation of survey results.

Technical Assistance - Field Survey Team

The EML Field Survey Team currently provides technical assistance at sites undergoing remediation where radiological surveys are required. General consultation and specific guidance and training can be provided along with quality assurance, including the performance of confirmation surveys. As a federal DOE lab, EML serves as a technical interface between



DOE site personnel and the contractors who are engaged in survey programs. Efforts in this area should help to insure that surveys are conducted with a high degree of quality in a cost effective manner. Subject areas for assistance include:

- *in situ* measurements
- "hot spot" assessment
- intercomparisons / cross-calibrations
- soil sampling
- sediment core / grab sampling
- air monitoring / aerosol measurements
- radon and radon progeny measurements
- survey plans
- statistical tests
- MARSSIM methodology

Facilities and critical radionuclides at which EML has demonstrated new survey methodology include:

- | | |
|-----------------------|---------------|
| ♦ Reactors | Cs-137, Co-60 |
| ♦ Manufacturing Plant | U-238 |
| ♦ Processing Facility | Th-232 series |
| ♦ Fabrication Plant | natural U |



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Decommissioning Survey Guidance

EML is under contract to the Nuclear Regulatory Commission to provide the technical basis to support the implementation of proposed new decommissioning criteria. This has included the development of methodology to be employed in final status surveys. Guidance is provided in two draft NRC documents: "A Non-Parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys" (NUREG-1505) and "Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria" (NUREG-1506). Demonstration surveys using these methodologies are taking place at a variety of NRC licensed facilities.

EML Participation in Standards Development

ICRU Report No. 53, "Gamma-Ray Spectrometry in the Environment."

ANS 41.1 writing group, "Analytical Methods for *In Situ* Gamma-Ray Emitters in Soil"



In-situ Spectrometry for D&D

Increasingly, the DOE is relying on measurements that can be performed directly in the field to support cleanup. EML is active in advancing the state-of-the-art for radioactivity measurements, particularly in the area of *in situ* gamma-ray spectrometry, a technique for assessing specific radionuclide concentrations. In place of potentially non-representative soil sampling techniques and time consuming laboratory analyses, *in situ* spectrometry can provide a measurement of several tons of soil in just a few minutes at the measurement site, thus providing savings in time, effort and expense.

